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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Missile Defense Agency	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	2,212.623	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
MD01: Command & Control, Battle Management, Communications (C2BMC)	1,537.745	278.263	270.033	279.389	-	279.389	291.528	280.506	279.616	289.122	Continuing	Continuing
MC01: Cyber Operations	5.730	1.587	5.305	7.651	-	7.651	26.943	16.180	15.923	23.989	Continuing	Continuing
MT01: C2BMC Test	183.985	56.125	57.302	54.100	-	54.100	54.712	55.539	50.661	52.342	Continuing	Continuing
MX01: Command & Control, Battle Management, Communications (C2BMC) Development Support	397.104	111.323	103.440	112.910	-	112.910	119.861	120.577	123.051	126.959	Continuing	Continuing
MD40: Program-Wide Support	88.059	18.135	18.782	21.118	-	21.118	22.195	22.071	22.868	23.117	Continuing	Continuing

**Program MDAP/MAIS Code:** 362

**Note**

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$16.300 million was required to address emergency warfighting readiness requirements in support of Mobile Sensor Integration Program and Advanced Discrimination. Additional details are available at a higher classification level.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$24.747 million is required to address emergency warfighting requirements in support of Mobile Sensor Integration Program, Advanced Discrimination, USPACOM Joint Emergent Operational Need Statement (JEON), and Aegis SM-3 Block IIA Missile Test. Additional details are available at a higher classification level.

**A. Mission Description and Budget Item Justification**

The Command and Control, Battle Management, and Communications (C2BMC) program is the integrating element of the Ballistic Missile Defense System (BMDS). It is a vital operational system that enables the U.S. President, Secretary of Defense and Combatant Commanders at strategic, regional and operational levels to systematically plan ballistic missile defense operations, to collectively see the battle develop, and to dynamically manage designated networked sensors and weapons systems to achieve global and regional mission objectives. Systems linked through C2BMC include Patriot, Terminal High Altitude Area Defense (THAAD), Aegis Ballistic Missile Defense (BMD), Aegis Ashore, Ground-based Midcourse Defense (GMD), and Army Integrated Air and Missile Defense Battle Command System (IBCS), and sensors such as the Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) Radar, Sea-Based X-Band Radar (SBX), Homeland Defense Radar - Pacific (HDR-P), Homeland Defense Radar - Hawaii, Space-Based Infrared System (SBIRS), and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA). The C2BMC program also works to increase coalition partners' capabilities and investigates concepts and explores system engineering issues associated with innovative space applications for a missile defense intercept and defeat system.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	
0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)	PE 0603896C I Ballistic Missile Defense Command and Control, Battle Management & Communication	
<p>FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+16.650M was required to address Joint Emergent Operational Need requirements to ensure readiness of the BMDS. \$+16.650M Project MD01-C2BMC/C2BMC Development and Deployment to begin OSD Joint Rapid Acquisition Cell (JRAC)-directed efforts to develop and field a limited capability to provide missile warning and tracking of hypersonic weapons.</p> <p>FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$16.300 million was required to address emergency warfighting readiness requirements in support of Mobile Sensor Integration Program and Advanced Discrimination.</p> <p>+ \$16.300M Project MD01-C2BMC/C2BMC Development and Deployment. This is a base budget requirement.</p> <p>* + \$10.000M was required for studies and analysis to improve communications network for Mobile Sensor Integration Program.</p> <p>* + \$6.300M was required to improve the BMDS ability to identify lethal and non-lethal objects. This Advanced Discrimination is required to continue to defend the homeland, deployed forces and regional allies against evolving threats of increasing sophistication.</p> <p>FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$24.747 million is required to address emergency warfighting requirements.</p> <p>+ \$19.000M Project MD01-C2BMC/C2BMC Development and Deployment: This is a base budget requirement.</p> <p>* + \$10.000M is required to complete studies and analysis, and field communications improvements for Mobile Sensor Integration Program.</p> <p>* + \$6.000M is required to improve the BMDS ability to identify lethal and non-lethal objects. This Advanced Discrimination is required to continue to defend the homeland, deployed forces and regional allies against evolving threats of increasing sophistication.</p> <p>* + \$3.000M is required to fund the C2BMC portion of the USPACOM Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement - MSE) ballistic missile defense system that expands engagement options and increases coverage area.</p> <p>+ \$5.747M Project MT01 C2BMC Test: required to fund an SM-3 IIA flight test, in FY19, to demonstrate a capability against threat target in support of homeland defense. This is a base budget requirement.</p>		

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Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication			
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	456.267	430.115	461.275	-	461.275
Current President's Budget	465.433	454.862	475.168	-	475.168
Total Adjustments	9.166	24.747	13.893	-	13.893
• Congressional General Reductions	-10.239	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	3.900	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	5.036	0.000			
• SBIR/STTR Transfer	-5.831	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	16.300	24.747	0.000	-	0.000
• Other Adjustment	0.000	0.000	13.893	-	13.893
Change Summary Explanation					
The FY 2017 Reprogramming Increase reflects C2BMC Experimentation Lab (X-Lab) / Enterprise Sensors Lab (ESL) support of risk mitigation by providing infrastructure upgrades enabling increased data throughput and improved security posture for discrimination integration and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA) capabilities.					
Increase in FY 2019 from PB 2018 to PB 2019 provides development and deployment of Initial Robust BMDS Post Intercept Assessment capabilities for Increment 7, increased Discrimination development efforts supporting Homeland Defense (Increment 6), upgrades development Lab hardware-in-the-loop (HWIL) infrastructure at the Missile Defense Integration and Operation Center, and increased C2BMC Cybersecurity measures including the implementation of Windows Server 2016 software.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication				Project (Number/Name) MD01 / Command & Control, Battle Management, Communications (C2BMC)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD01: Command & Control, Battle Management, Communications (C2BMC)	1,537.745	278.263	270.033	279.389	-	279.389	291.528	280.506	279.616	289.122	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

N/A

**A. Mission Description and Budget Item Justification**

This project funds the development, deployment and operational support of C2BMC capabilities required for BMDS planning, situational awareness, sensor management, and engagement coordination. C2BMC capabilities are traceable to baselined BMDS specifications and Element specifications to ensure the BMDS functions as an integrated system. C2BMC development activities culminate in three key events: simulation-based verification focused on integration testing with other BMDS elements; Site Activation Testing; and BMDS Ground Testing verifying delivery of operational software packages for designated spiral deliveries to the warfighter.

Designated Capability Deliveries include:

The Robust Medium-Range Ballistic Missile (MRBM) Defense / Improved Discrimination European Phased Adaptive Approach (EPAA) Phase 1 and 2 (Spiral 6.4) is partially decommissioned but remains operational in CENTCOM and EUCOM.

Enhanced Homeland Defense (Spiral 8.2-1) is currently fielded and actively sustained. This spiral provides critical Homeland Defense capabilities for increased GMD battlespace, improved threat tracking using multiple sensors communicating via Link 16, enhanced sensor tasking to meet track quality and discrimination timeliness requirements, space situational awareness tasking support, and improved cyber capabilities. Spiral 8.2-1 also integrates the BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA) with the BMDS to enhance system level missile-tracking capabilities through earlier cueing of radars and weapon systems.

Fulfilling Presidential mandate, EPAA Phase 3/Engage-on-Remote (EOR) (Spiral 8.2-3) will deliver critical sensor management capability, greater engagement flexibility, improved OPIR-based cueing, and enhanced Aegis BMD defended area by enabling Aegis to use Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) data for EOR engagements.

C2BMC is in the preliminary design phase for Long Range Discrimination Radar (LRDR) Control for Homeland Defense (Spiral 8.2-5). This spiral will increase homeland and regional defense capabilities by providing LRDR sensor management, a BMD System track inclusive of LRDR sensor data, BOA 7.0 leveraging advance threat limited contingency capabilities, Link-16 reporting integration, system level discrimination data integration, transmission of LRDR-based information to GMD Fire Control (GFC) and other BMDS elements, and integration of the BMDS with the new Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS).

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<p>Regional and Homeland Defense Enhancements (Increment 7) continues in planning and initiates development efforts during FY 2019. Capabilities associated with this Spiral include C2BMC tasking of OPIR Enterprise assets, enhanced system-level integrated discrimination functionality with Simultaneous Correlation of Unambiguous Tracks (SCOUT), Initial Robust Post Intercept Assessment (PIA), regional weapon system use of Link 16 based system track, AN/TPY-2 tasking improvements to support Aegis Engage on Remote, transmission of advanced discrimination features for regional BMD use, and monitoring of modified Aegis BMD, THAAD, PATRIOT, IBCS peer-to-peer engagement coordination.</p> <p>Related disciplines provide development and deployment support to C2BMC system capabilities. In support of Hypersonic Defense, C2BMC will provide contingency capability to demonstrate, develop and deploy a detection and warning for advanced threats.</p> <p>C2BMC International Partner system engineering ensures friends and allies are integrated to the fullest extent possible with U.S. BMDS capabilities. Collaborative system engineering, testing, and fielding facilitate interoperability with North Atlantic Treaty Organization (NATO) and partner nations such as Israel and Japan. C2BMC works with these nations to define and document international interfaces that are compatible with international standards and traceable to U.S. BMDS requirements. C2BMC participates in test events and live fire exercises hosted by international partners to ensure U.S. missile defense weapons, sensors, and C2 systems are interoperable with international systems. C2BMC maintains and upgrades the U.S./NATO secure data sharing gateways located at Ramstein Air Base, Germany, for missile defense operations and training. C2BMC also supports development of Japan's BMD requirements to ensure interoperability of Japanese and U.S. BMD systems (sensors, shooters, command and control) resulting in an integrated regional, operational, and strategic defense of Japan.</p> <p>C2BMC Modeling and Simulation (M&amp;S) maintains BMDS simulation/stimulation tools and federated models to support development and verification of deployed C2BMC Spirals. The BMDS C2BMC Model (BCM) is used for Flight Test pre-mission analysis and exercises to represent a second Command and Control (C2) Suite for Cross-Area of Responsibility (XAOR) functionality, and supports development and integration of GMD, AN/TPY-2, and Aegis software and models. The BCM program provides a cost effective means to assess and explore the performance space of the BMDS beyond what can be physically tested via Flight Tests and Target of Opportunity collections.</p> <p>The C2BMC Program Element also sustains an evolutionary development capability to experiment with and prototype candidate C2BMC technologies. C2BMC incorporates BOA enhancements to enable the BMDS to keep pace with emerging threats. C2BMC develops, integrates, and tests advanced algorithms to improve discrimination capabilities and enhance the use of space-based sensor data. BOA fuses worldwide coverage of multiple SBIRS and Intelligence Community sensor data into precision three-dimensional missile tracks that C2BMC uses for radar and fire control cueing. BMDS Overhead Persistent Infra-Red Architecture (BOA) software version 5.1 will provide initial boost phase tracking when delivered to the warfighter with Enhanced Homeland Defense (Spiral 8.2-1) in FY 2018. BOA software version 6.1 will extend discrimination target tracking by adding wideband sensors when delivered with EPAA Phase 3/EOR (Spiral 8.2-3) in FY 2019.</p> <p>Post Intercept Assessment (PIA) is a BMDS capability that improves engagement effectiveness by synthesizing BMDS sensor multi-phenomenology tracking and discrimination data, communicating specific cueing and tasking messages, and implementing data analysis and decision logic tasks. Through a time-phased approach, each BMDS Element incrementally develops their contributions to the PIA solution. C2BMC's primary contributions to PIA include sensor and weapon</p>		

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system interfaces, sensor cueing/tasking, improved track processing, development and integration of multi-phenomenology physics-based prediction models, and the assessment decision logic and integrated display for the BMDS.				
In support of MDA's discrimination improvements effort, C2BMC will demonstrate, develop, and deploy multiple techniques to improve BMD System ability to identify lethal and non-lethal objects.				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
Title: C2BMC Development and Deployment		224.549	213.853	253.472
Articles:		-	-	-
Description: Provides funding for development and deployment of C2BMC capability Spirals that will link sensors and shooters to enable integrated BMDS capabilities, integrate BOA with the BMDS architecture to enhance missile tracking capabilities and enable much earlier cueing of radars and shooters, and fulfill Cybersecurity requirements. The Enterprise Sensors Laboratory (ESL) and Experimentation Laboratory (X-Lab) produce key prototypes for further maturation in the C2BMC capability Spiral development process and enables integrated experimentation for C2BMC, ESL, OPIR products, and other BMDS elements through robust connectivity to simulation frameworks, weapon systems, sensors, and operational assets. Recurring accomplishments include development and procurement of hardware, software, network capability system engineering tasks, and artifact development for critical design reviews; participation in test readiness reviews, pre-test engineering and analysis of ground and flight test results, wargames, and exercises in accordance with the BMDS Integrated Master Test Plan (IMTP); site planning, scheduling and hardware acquisition to support planned deployment of C2BMC Spirals and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA) capabilities; update/maintain C2BMC Model (BCM) BMDS simulation/stimulation (federated model) and verification scenarios for all C2BMC Spirals deployed and under development; prototyping and characterizing BOA, Discrimination, and C2BMC capabilities. Build and sustain operational data sharing gateways and collaborate with international partners to ensure future interoperability. Specific and/or unique accomplishments for each FY are as follows:  FY 2018 Plans: The net decrease from FY 2017 to FY 2018 reflects the completed development, testing and fielding of Enhanced Homeland Defense (Spiral 8.2-1) offset in part by an increase for Discrimination Improvements and Countermeasures Mitigation, LRDR Command & Control risk reduction efforts for NORTHCOM C2BMC mission suite, and BMDS Post Intercept Assessment development. Additionally, decrease captures the FY 2017 Congressional General Reduction for unauthorized prior year funding.  MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4): -- Maintain capability to develop/deploy emergent operational requirements.				

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2017</b>	<b>FY 2018</b>
<p>Enhanced Homeland Defense (Spiral 8.2-1):</p> <ul style="list-style-type: none"> <li>-- Maintain red/blue force updates into the Planner to stay current with the latest threat and BMDS element updates.</li> </ul> <p>EPAA Phase 3 / EOR (Spiral 8.2-3):</p> <ul style="list-style-type: none"> <li>-- Complete development; continue fielding of hardware and capability to EUCOM, CENTCOM, NORTHCOM, and PACOM and support operation.</li> <li>-- Integrate EOR capability support to Aegis 5.1.</li> <li>-- Complete BMDS Overhead Persistent Infra-Red Architecture Phase 6.1 software verification testing and Ship Readiness Review (SRR).</li> <li>-- Continue Integration and testing improved OPIR-based cueing of radars and shooters to add the ability to track threats in all phases of flight.</li> </ul> <p>LRDR for Homeland Defense (Spiral 8.2-5):</p> <ul style="list-style-type: none"> <li>-- Continue to conduct/complete preliminary Critical Design Review (CDR) for the following capabilities: <ul style="list-style-type: none"> <li>--- LRDR task management</li> <li>--- Regional peer-to-peer engagement coordination.</li> <li>--- Interoperability with Sea-based X-band Radar (SBX) forward based discrimination data.</li> <li>--- 2020 Integrated Air and Missile Defense Battle Command System Engagement Operations Center (EOC) interoperability.</li> <li>--- Continue prototyping OPIR enhancements to address new threats.</li> <li>--- Integrate C2BMC capabilities with Army's IAMD Battle Command System.</li> <li>--- Initiate BCM development and provide OPIR modeling simulation for ground tests.</li> <li>--- Initiate integration of hypersonic capabilities into the C2BMC program of record.</li> </ul> </li> </ul> <p>C2BMC Increment 7, regional defense focus:</p> <ul style="list-style-type: none"> <li>-- Initiate Post Intercept Assessment (PIA) Phase 1 and 2 development/integration actions that enables shoot-assess-shoot shot doctrine within the BMDS.</li> </ul> <p><b>FY 2019 Plans:</b></p> <p>Enhanced Homeland Defense (Spiral 8.2-1):</p> <ul style="list-style-type: none"> <li>-- Maintain ability to develop/deploy capability in response to emergent operational requirements.</li> </ul> <p>EPAA Phase 3 / EOR (Spiral 8.2-3):</p> <ul style="list-style-type: none"> <li>-- Complete fielding of hardware and capability to EUCOM, CENTCOM, NORTHCOM, and PACOM and support operation.</li> </ul>			

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>-- Complete fielding of BMDS Overhead Persistent Infra-Red Architecture (BOA) 6.1.</p> <p>-- Provide analysis support for Technical Capability Declaration.</p> <p>LRDR for Homeland Defense (Spiral 8.2-5), homeland defense focus:</p> <p>-- Replan Critical Design Review caused by requirements expansion for Discrimination Data Integration and Integrated Threat Characterization. No impact on final Increment 6b delivery is expected.</p> <p>-- Complete development tasks and conduct Critical Design Review</p> <p>-- Complete model and simulation development to support requirement verification, ground test events and provide Wideband OPIR modeling and simulation for ground tests.</p> <p>-- Continue Exceedance Generation Processing (EGP) from SBIRS measurement level wideband data to improve tracking accuracy and custody for challenging threats.</p> <p>-- Continue physics-based algorithm improvements for missile typing which are necessary to address emerging threats.</p> <p>C2BMC Increment 7, regional defense focus:</p> <p>-- Continue planning and development tasks for Initial Robust BMDS Post Intercept Assessment including Spacebased Kill Assessment (SKA).</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></p> <p>The increase from FY 2018 to FY 2019 reflects an expansion of C2BMC Increment 6b (LRDR for Homeland Defense (Spiral 8.2-5)) capability for System Level Discrimination Data Integration and Integrated Threat Characterization development and fully funds Initial Robust BMDS Post Intercept Assessment development efforts. Additionally, the increase includes consolidating reporting from Enterprise Sensors Lab (ESL) and C2BMC Experiment Lab (X-Lab) to C2BMC Development and Deployment. ESL and X-lab tasks are integral to C2BMC development; a direct coupling of activities yields a more comprehensive and representative summary of C2BMC development and deployment activities.</p>				
<p><b>Title:</b> C2BMC Communications</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> The BMD Communications Network (BCN) ties together an expanding set of sensors and weapons systems to enable the National Command Authority and the commanders at the strategic, theater and tactical levels to optimally engage ballistic missile threats including near simultaneous theater, regional and homeland attacks. Recurring accomplishments include the following:</p>		28.102 -	30.872 -	25.917 -

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Provide GMD Communications Network (GCN) Long Haul Communications Transport (LHCT)) services and a robust, end-to-end, high availability, operational communications network (COMNET) infrastructure with diverse paths that quickly and unambiguously share information across the global BMDS.</p> <p>- Participate in and analyze results from events scheduled in the BMDS IMTP</p> <p>- Provide engineering and deployment support of C2BMC Deployable Interface Nodes</p> <p>- Provide BMDS communications via leased DISA circuits, and resolves real-time operational issues through DISA's Network Operations and Security Center</p> <p>- Provide effective network management to coordinate and integrate information across diverse equipment platforms, interface with other DoD communications systems, evolve information standards and capabilities, and adhere to the DoD Risk Management Framework (RMF).</p> <p>- Upgrade BCN capability by supporting all EPAA phases and DoD teleports to enhance satellite communications.</p> <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p><b>FY 2018 Plans:</b></p> <p>The FY 2017 to FY 2018 net increase reflects the hardening of communication that will provide anti-jam and anti-scintillation capability and captures the FY 2017 Congressional General Reduction for unjustified growth.</p> <p>- Provide Ground-Based Midcourse Defense support to SBX communications upgrade to replace end of life / end of sale SATCOM equipment and services.</p> <p>- Acquire additional network circuits to support planned EPAA Phase 3/EOR (Spiral 8.2-3) capability deployment.</p> <p>- Initiate planning for modem tech refresh and the next generation waveform integration.</p> <p><b>FY 2019 Plans:</b></p> <p>- Acquire network circuits to support the Ground-Based Midcourse Defense Communication Network Modernization.</p> <p>- Conduct Protected Anti-Jam/Anti-Scintillation Wideband Net-Centric System (PAAWNS) modem integration and installations.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></p> <p>Decrease in FY 2019 from FY 2018 reflects reduced integration and installation costs for PAAWNS modems resulting from reduced FY 2018 hardware purchase.</p>				
Title: Enterprise Sensors Lab (ESL)		20.306	15.645	0.000
Articles:		-	-	-
Description: ESL performs early integration of new capabilities for future C2BMC BOA development and soaks these capabilities against real-world Targets of Opportunity (TOOs) and MDA flight and ground tests to increase the technical maturity of critical algorithms and reduce risk. To improve the real-time utilization of all available OPIR and other Intelligence Community (IC) data,				

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>ESL and supporting activities prototype and demonstrate algorithms that fuse space, airborne, and terrestrial-based sensor data into three-dimensional (3-D) tracks in the boost and early mid-course phases of threat missile flyout, enabling sensor cueing and Launch/Engage-on-Remote (LOR/EOR) intercepts. Additionally, in support of Homeland Defense, ESL extracts features in support of PIA with a goal of enabling a shoot-look-shoot capability and discrimination assessment feedback. Recurring accomplishments include providing prototype development and predicted performance characterization for emerging MDA capabilities.</p> <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p><b>FY 2018 Plans:</b>            Decrease from FY 2017 to FY 2018 reflects FY 2017 risk mitigation efforts providing lab infrastructure upgrades and improved security posture.</p> <ul style="list-style-type: none"> <li>- Expand connectivity to Intelligence Community (IC) and similar architectures and mature IC sensor data processing yielding mutually beneficial real-time data sharing and more robust fused data products.</li> <li>- Initiate Exceedance Generation Processing (EGP) from SBIRS measurement level wideband data to improve tracking accuracy and custody for challenging threats.</li> <li>- Initiate physics-based algorithm improvements for missile typing which are necessary to address emerging treats.</li> <li>- Initiate prototype development and predicted performance characterization for Discriminating Sensors Technology and Spacebased Kill Assessment (SKA).</li> </ul> <p><b>FY 2019 Plans:</b> N/A</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>            Decrease in FY 2019 from FY 2018 reflects consolidating ESL activities into the C2BMC Development and Deployment accomplishment area yielding a more comprehensive and representative summary of C2BMC development and deployment activities.</p>				
<p><b>Title:</b> C2BMC Experimentation Lab (X-Lab)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> The C2BMC X-Lab explores, prototypes, and demonstrates future C2BMC technologies within C2BMC and as an integrated component with other BMDS elements. X-Lab evaluates proposed interfaces and data distribution architectures with the Joint Overhead persistent Infra-Red (OPIR) Ground (JOG), SBIRS to improve cueing efficiency and increase battlespace for Homeland Defense. The lab hosts fielded, in-development and prototype spiral development capabilities and enables flight and ground test participation for C2BMC, ESL, and OPIR products with robust connectivity to simulation frameworks, weapon systems,</p>		5.306 -	6.663 -	0.000 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency			Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication	Project (Number/Name) MD01 / Command & Control, Battle Management, Communications (C2BMC)			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019	
<p>sensors, and operational assets. X-Lab performs early risk reduction activities resulting in on time, within budget deliveries to the C2BMC program contributing to a more effective BMDS.</p> <p>Recurring accomplishments include collection and analysis of metrics that demonstrate C2BMC performance utilizing representative Suite hardware and software, assessing prospective technologies' impact on the BMDS and characterizing C2BMC Spiral performance in advance of formal deliveries.</p> <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p><b>FY 2018 Plans:</b></p> <p>The increase in funding from FY 2017 to FY 2018 reflects the funding increase for BMDS Post Intercept Assessment development.</p> <p>- Initiate Post Intercept Assessment prototyping activities.</p> <p>-- Assess Link 16 engagement coordination capabilities for planning and managing the execution of Link 16 remote engagements. This effort will include EOR evaluation in a series of flight and ground tests.</p> <p>-- Evaluate interface requirements and message sets for prototype non-OPIR advanced sensors.</p> <p><b>FY 2019 Plans:</b></p> <p>N/A</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></p> <p>Decrease in FY 2019 from FY 2018 reflects consolidating X-Lab activities into the C2BMC Development and Deployment accomplishment area yielding a more comprehensive and representative summary of C2BMC development and deployment activities.</p>					
<p><b>Title:</b> United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEON)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Provides funding for development and deployment of C2BMC portion of the USPACOM Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement - MSE) ballistic missile defense system that expands engagement options and increases coverage area.</p> <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p><b>FY 2018 Plans:</b></p> <p>Increase in funding for FY 2018 is attributed to the FY 2018 Missile Defeat and Defense Enhancements (MDDE) Budget Amendment to address emergency warfighting requirements.</p>		0.000 -	3.000 -	0.000 -	

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MD01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
- Configure and deployed C2BMC communication node supporting USPACOM Joint Emergent Operational Need.			
<b>FY 2019 Plans:</b> N/A			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in FY 2019 reflects the completion of C2BMC efforts supporting the USPACOM communication node.			
<b>Accomplishments/Planned Programs Subtotals</b>	278.263	270.033	279.389

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603881C: <i>Ballistic Missile</i>	197.171	292.262	214.173	-	214.173	199.399	197.451	174.161	152.174	Continuing	Continuing
<i>Defense Terminal Defense Segment</i>											
• 0603882C: <i>Ballistic</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
<i>Missile Defense Midcourse</i>											
<i>Defense Segment</i>											
• 0603884C: <i>Ballistic</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
<i>Missile Defense Sensors</i>											
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	37.809	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603895C: <i>Ballistic Missile</i>	20.910	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
<i>Defense System Space Programs</i>											
• 0603904C: <i>Missile</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
<i>Defense Integration and Operations Center (MDIOC)</i>											
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MD01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC)</i>	

**C. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing
• 0604181C: <i>Hypersonic Defense</i>	0.000	75.300	120.444	-	120.444	157.672	142.296	117.381	119.434	0.000	732.527
• 0604673C: <i>Pacific Discriminating Radar</i>	0.000	0.000	95.765	-	95.765	164.167	497.630	604.085	402.890	0.000	1,764.537
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	186.172	357.659	164.562	-	164.562	91.603	78.112	108.167	133.728	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Enhanced Homeland Defense (Spiral 8.2-1) will be fielded in FY 2018, fielding of EPAA Phase 3/EOR (Spiral 8.2-3) in FY 2019, and completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber ops support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication				Project (Number/Name) MD01 / Command & Control, Battle Management, Communications (C2BMC)					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
C2BMC Development and Deployment - Aggregated Discrim	Various	Various : Various	0.000	10.490	Oct 2016	7.765	Oct 2017	5.700	Oct 2018	-		5.700	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA Development	SS/CPAF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	12.794	10.315	Oct 2016	9.541	Oct 2017	4.361	Oct 2018	-		4.361	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Hardware/Software Development, Integration & Test (I&T)	SS/CPIF	Lockheed Martin Team : Huntsville, AL/Colorado Springs, CO	548.520	123.778	Dec 2016	121.451	Dec 2017	108.796	Dec 2018	-		108.796	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Integration	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	160.198	0.000		0.000		8.417	Oct 2018	-		8.417	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Mid- Term Discrim-SCOUT	SS/CPFF	Northrop Grumman Space and Mission Systems : Huntsville, AL	29.128	4.900	Oct 2016	7.133	Aug 2018	6.700	Aug 2019	-		6.700	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Mid- Term Discrim-SCOUT OGA	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	2.400	0.000		1.170	Dec 2017	0.700	Dec 2018	-		0.700	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Contract Support Services	SS/FFP	Cobham Analytic Solutions, ECS, CACI, CSC : Arlington, VA/ Huntsville, AL	227.867	25.026	Oct 2016	0.000		0.000		-		0.000	252.893	505.786	0.000
C2BMC Development and Deployment - Contract Support Services (CSS)	C/CPFF	MiDAESS / TEAMS : Huntsville, AL;	0.000	0.000		22.966	Feb 2018	31.066	Feb 2019	-		31.066	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication				Project (Number/Name) MD01 / Command & Control, Battle Management, Communications (C2BMC)					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
		Colorado Springs, CO; NCR													
C2BMC Development and Deployment - ESL Advance Technology Support	SS/CPAF	Northrop Gruman Space and Mission Systems : Colorado Springs, CO	0.000	0.000		0.000		8.500	Nov 2018	-		8.500	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Federally Funded Research & Development Centers / University Affiliated Research Center	MIPR	MITRE, IDA, ORNL, Aerospace, JHU/APL, GTRI : Arlington, VA/ Huntsville, AL/ Colorado Springs, CO	140.210	21.405	Oct 2016	16.136	Oct 2017	16.460	Oct 2018	-		16.460	Continuing	Continuing	Continuing
C2BMC Development and Deployment - IT User Services	C/CPAF	Northrop Grumman/ Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	4.898	0.000		0.000		5.989	Oct 2018	-		5.989	Continuing	Continuing	Continuing
C2BMC Development and Deployment - MDA Civilian, Travel & PCS	Various	- : Huntsville, AL/ Colorado Springs, CO	128.044	21.635	Oct 2016	22.116	Oct 2017	23.573	Oct 2018	-		23.573	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Models & Simulation	SS/CPIF	Lockheed Martin Team : Huntsville, AL/Colorado Springs, CO	0.000	0.000		0.000		6.685	Nov 2018	-		6.685	Continuing	Continuing	Continuing
C2BMC Development and Deployment - OPIR Integration	SS/CPIF	Lockheed Martin : Huntsville, AL	0.000	1.000	Oct 2016	1.009	Oct 2017	0.000		-		0.000	2.009	4.018	0.000
C2BMC Development and Deployment - Post Intercept Assessment	C/CPAF	SciTec : Newark, NJ	0.000	0.000		3.300	Nov 2017	2.220	Nov 2018	-		2.220	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Post Intercept Assessment Integration	SS/CPIF	Lockheed Martin Team : Huntsville, AL/Colorado Springs, CO	0.000	0.000		0.000		14.181	Nov 2018	-		14.181	Continuing	Continuing	Continuing

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Missile Defense Agency</b>												<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 0400 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>						<b>Project (Number/Name)</b> MD01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC)</i>			
<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
C2BMC Development and Deployment - Post Intercept Assessment Prototyping	C/CPAF	Corvid : Huntsville, AL	0.000	0.000		0.000		2.220	Nov 2018	-		2.220	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Spiral Development	Various	Sandia, MDA Other : Various	0.000	6.000	Oct 2016	1.266	Oct 2017	2.983	Oct 2018	-		2.983	Continuing	Continuing	Continuing
C2BMC Development and Deployment - X Lab	SS/CPIF	Lockheed Martin : Huntsville, AL	0.000	0.000		0.000		4.921	Oct 2018	-		4.921	Continuing	Continuing	Continuing
C2BMC Communications - Communication Equipment and Fielding	MIPR	DISA, PMDCATS, SPAWAR : Springfield, VA	120.418	12.884	Oct 2016	15.151	Jan 2018	14.222	Jan 2019	-		14.222	Continuing	Continuing	Continuing
C2BMC Communications - BNOSC	SS/CPAF	Lockheed Martin Team / JRDC : Colorado Springs, CO	22.815	4.062	Oct 2016	4.566	Nov 2017	2.426	Nov 2018	-		2.426	Continuing	Continuing	Continuing
C2BMC Communications - C2BMC Integration	Various	Services : DISA Agency	0.000	3.450	Oct 2016	3.665	Oct 2017	0.000		-		0.000	7.115	14.230	0.000
C2BMC Communications - Communication Leases	MIPR	DISA : Arlington, VA	36.479	7.706	Oct 2016	7.490	Oct 2017	9.269	Oct 2018	-		9.269	Continuing	Continuing	Continuing
C2BMC Communications - EUCOM Communications	MIPR	USAFE : Ramstein, DE	13.045	0.000		0.000		0.000		-		0.000	13.045	26.090	0.000
Enterprise Sensors Lab (ESL) - ESL	SS/CPAF	Sandia, Purdue, SciTech, DISA, Army, Navy, AMRDEC : Various	0.000	8.875	Oct 2016	8.161	Feb 2018	0.000		-		0.000	17.036	34.072	0.000
Enterprise Sensors Lab (ESL) - Enterprise Sensor Lab	SS/CPAF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	44.450	11.431	Oct 2016	7.484	Oct 2017	0.000		-		0.000	59.365	122.730	0.000
C2BMC Experimentation Lab (X-Lab) - X-Lab	SS/CPAF	Various / Lockheed Martin : Colorado Springs, CO	46.479	5.306	Oct 2016	6.663	Oct 2017	0.000		-		0.000	57.412	115.860	0.000

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Missile Defense Agency													<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 0400 / 4							<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>					<b>Project (Number/Name)</b> MD01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC)</i>				

  

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEON) - C2BMC Hardware/ Software Development, Integration & Test (I&T)	SS/CPIF	Lockheed Martin : Huntsville, Al	0.000	0.000		3.000	Apr 2018	0.000		-		0.000	3.000	6.000	0.000
<b>Subtotal</b>			1,537.745	278.263		270.033		279.389		-		279.389	Continuing	Continuing	N/A

**Remarks**  
N/A

  

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

**Remarks**  
N/A

  

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

**Remarks**  
N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Missile Defense Agency												<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 0400 / 4					<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>					<b>Project (Number/Name)</b> MD01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC)</i>				

  

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

  

<b>Remarks</b> N/A															
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	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	1,537.745	278.263		270.033		279.389		-		279.389	Continuing	Continuing	N/A

  

<b>Remarks</b> Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.													
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency																Date: February 2018													
Appropriation/Budget Activity 0400 / 4										R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication										Project (Number/Name) MD01 / Command & Control, Battle Management, Communications (C2BMC)									
Significant Event Complete ▲					Milestone Decision Complete ★					Element Test Complete ◆					System Level Test Complete ●					Complete Activity ◆									
Significant Event Planned △					Milestone Decision Planned ☆					Element Test Planned ◇					System Level Test Planned ○					Planned Activity ◇									
										FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
MD01 Command & Control, Battle Management, Communications (C2BMC)										◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇					
Spiral 8.2-1 NORTHCOM/PACOM Capability Declaration														△															
USFK JEON User Node Delivery															△														
Spiral 8.2-3 EUCOM/CENTCOM Capability Declaration																△													
Spiral 8.2-3 NORTHCOM/PACOM Capability Declaration																	△												
Spiral 8.2-5 Homeland Defense Capability Declaration																				△									

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Missile Defense Agency			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MD01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC)</i>	

## Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD01 Command & Control, Battle Management, Communications (C2BMC)	1	2017	4	2023
Spiral 8.2-1 NORTHCOM/PACOM Capability Declaration	2	2018	2	2018
USFK JEON User Node Delivery	4	2018	4	2018
Spiral 8.2-3 EUCOM/CENTCOM Capability Declaration	1	2019	1	2019
Spiral 8.2-3 NORTHCOM/PACOM Capability Declaration	3	2019	3	2019
Spiral 8.2-5 Homeland Defense Capability Declaration	3	2021	3	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication				Project (Number/Name) MC01 / Cyber Operations			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC01: Cyber Operations	5.730	1.587	5.305	7.651	-	7.651	26.943	16.180	15.923	23.989	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

N/A

**A. Mission Description and Budget Item Justification**

C2BMC Cyber Operations sustain the MDA Risk Management Framework (RMF) and Security Controls Assessments (SCA)/Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plan of Action and Milestones (POA&Ms) for MDA C2BMC mission systems. Activities in this Project are necessary to comply with the Federal Information Systems Modernization Act (FISMA).

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Network/System Certification and Accreditation (C&A)	1.587	5.305	7.651
<b>Articles:</b>	-	-	-
<p><b>Description:</b> This activity maintains the Assessment and Authorization (A&amp;A) and Certification and Accreditation (C&amp;A) data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Authorizing Official (AO) accreditation decisions) and POA&amp;Ms on all MDA information systems. This activity prepares and submits C&amp;A documentation and accreditation recommendations to the MDA Chief Information Officer (CIO) / Security Controls Assessor and the AO. Leverages Cross Domain Solution (CDS) as single authority implementing standard security policies for C2BMC across the BMDs. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of the MDA mission, test, and administrative systems.</p> <ul style="list-style-type: none"> <li>- Conduct cybersecurity design, engineering, and architecture planning for C2BMC information technology systems</li> <li>- Plan and test the cybersecurity controls for C2BMC systems</li> <li>- Conduct Security Controls Assessment testing continuous monitoring of C2BMC mission systems and provide POA&amp;Ms to mitigate cybersecurity vulnerabilities.</li> </ul> <p>Specific and/or unique accomplishments for each FY are as follows:</p>			
<p><b>FY 2018 Plans:</b></p> <p>The increase in funding from FY 2017 to FY 2018 captures transfer of Cross Domain Solution funds from Budget Project MT01-C2BMC Test and reflects the required upgrade of hardware and software to improve C2BMC network defense against cyber threats and enhance cybersecurity posture. The Department plans to implement Windows 10 Secure Host Baseline. Multiple</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency		<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MC01 / <i>Cyber Operations</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2017</b>	<b>FY 2018</b>
<p>Cybersecurity Studies are required that will ensure a more secure C2BMC system is procured and integrated into the BMDS as a part of future acquisition and development efforts. Completion of the studies will then flow to the application of security engineering principles to acquire, design, test, implement and field technical solutions throughout the systems architecture to ensure sufficient protections exist from a threat and risk based approach. Additionally, the increase will fund a NORTHCOM Mission Node to support the increased need for timely cybersecurity testing of vulnerability corrective actions, cybersecurity patching, and hardening on the C2BMC Program.</p> <p>- Initiate hardware/software upgrade to include Net Defense tool sets for real time cyber defense monitoring by the C2BMC Command Center that will support tier 3 defenders.</p> <p><b>FY 2019 Plans:</b></p> <p>- Continue purchase of hardware/software upgrades and implementation of Windows Server 2016.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></p> <p>The increase in funding from FY 2018 to FY 2019 reflects the continued upgrade of hardware and software and includes migration to Windows Server 2016 to improve C2BMC network defense against cyber threats and enhance cybersecurity posture.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>		1.587	5.305
<b>C. Other Program Funding Summary (\$ in Millions)</b>			
N/A			
<b>Remarks</b>			
<b>D. Acquisition Strategy</b>			
<p>The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Enhanced Homeland Defense (Spiral 8.2-1) will be fielded in FY 2018, fielding of EPAA Phase 3/EOR (Spiral 8.2-3) in FY 2019, and completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber ops support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MC01 / <i>Cyber Operations</i>
<p>Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor`s team to function in an Integrated Product Team environment.</p> <p><b><u>E. Performance Metrics</u></b> N/A</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication				Project (Number/Name) MC01 / Cyber Operations					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Network/System Certification and Accreditation (C&A) - Civ Cyber Labor	Various	MDA Other : Various	0.211	0.348	Oct 2016	0.352	Oct 2017	1.703	Oct 2018	-		1.703	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Core C2BMC	SS/IDIQ	Northrop Grumman : Colorado Springs, CO	0.000	0.682	Nov 2016	0.000		2.677	Oct 2018	-		2.677	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - IA/ CND Network/System C&A	C/CPFF	Torch Technologies : Colorado Springs, CO / Huntsville, AL	5.519	0.557	Jul 2017	0.562	Jul 2018	0.567	Oct 2018	-		0.567	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Information Assurance	SS/CPAF	Lockheed Martin : Colorado Springs, CO / Huntsville, AL	0.000	0.000		4.391	Jan 2018	2.704	Jan 2019	-		2.704	Continuing	Continuing	Continuing
Subtotal			5.730	1.587		5.305		7.651		-		7.651	Continuing	Continuing	N/A
Remarks N/A															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			5.730	1.587		5.305		7.651		-		7.651	Continuing	Continuing	N/A
Remarks N/A															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency														Date: February 2018																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency			Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	Project (Number/Name) MC01 / <i>Cyber Operations</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC01 Cyber Operations	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>				Project (Number/Name) MT01 / <i>C2BMC Test</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT01: <i>C2BMC Test</i>	183.985	56.125	57.302	54.100	-	54.100	54.712	55.539	50.661	52.342	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

N/A

**A. Mission Description and Budget Item Justification**

**TESTING**

Command and Control, Battle Management and Communications (C2BMC) Test supports system flight and ground testing, wargames, and exercises as detailed in the MDA Integrated Master Test Plan (IMTP) to ensure C2BMC capabilities delivered are consistent with the Prioritized Capabilities List and are interoperable with other Ballistic Missile Defense System (BMDS) components.

**LAB INFRASTRUCTURE**

C2BMC gains efficiencies and minimizes laboratory resource requirements (footprint, personnel, and hardware) by utilizing the C2BMC test bed infrastructure as the laboratory environment supporting System Test, Development, and Sustainment. For System Ground and Flight Test, the labs are used for pre-test analysis, test execution and post-test analysis. For Development, the labs are utilized for software verification and validation testing and system integration testing. For Sustainment, the labs are used to assist with root cause determination for issues discovered on the fielded system and validation of any required software patches.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Integrated Master Test Plan	56.125	57.302	54.100
<b>Articles:</b>	-	-	-
<b>Description:</b> This activity funds C2BMC participation in BMDS flight and ground testing, wargames and exercises, and resources in accordance with the BMDS IMTP. Recurring accomplishments include: Test Execution: - Assess BMDS interoperability, integration, and functionality in lab and distributed environments, leveraging a complex set of scenarios to test the limits of the C2BMC system. Participate in and analyze results of ground tests and flight tests in accordance with the BMDS IMTP. Support all phases of the MDA Ground Test Concept of Operations (CONOPS) and the MDA Flight Test CONOPS. Provide Flight Test Predictive Analysis support. Generate, test, and distribute federated model compatible scenarios for Ground Test and Flight Test Experimentation test support. Use BMDS C2BMC Model (BCM) to support exercise integration testing activities including test case and scenario checkout.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency		<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2017</b>	<b>FY 2018</b>
<p>Enterprise Sensors Laboratory (ESL):</p> <ul style="list-style-type: none"> <li>- Utilizing the ESL, plan, coordinate, and provide test operations to demonstrate prototype algorithms through flight tests, ground tests and real-world targets of opportunity. The development plans for algorithm improvements focus on track and measurement level sensor data fusion and feature extraction to improve 3-d track formation utilizing a variety of space, airborne, and terrestrial-based sensors. Results from the tests and experiments are provided back to the algorithms development activity to enable algorithm refinement.</li> </ul> <p>Experimentation Lab (X-Lab):</p> <ul style="list-style-type: none"> <li>- Utilizing the X-Lab, plan, coordinate, and provide test operations to demonstrate maturing C2BMC technologies and software builds within an integrated C2BMC environment through flight tests, ground tests and real-world targets of opportunity before incorporation into formal C2BMC spiral builds. The development plans for C2BMC improvements focus on the BMDS Post Intercept Assessment (PIA) capability, architecture improvements, and C2BMC algorithm improvements to mitigate development risk. Results from the tests and experiments are provided back to the C2BMC and X-Lab development activity.</li> </ul> <p>Wargame and Exercises:</p> <ul style="list-style-type: none"> <li>- Participate in wargames and exercises using current and future C2BMC architectures to support all requesting combatant commands, NATO partners, and Host Nations allowing warfighters to validate Ballistic Missile Defense (BMD) Techniques, Tactics, and Procedures (TTP) specific to all designated Areas of Operations (AOs) to include current and future C2BMC architectures.</li> </ul> <p>Resources:</p> <ul style="list-style-type: none"> <li>- Continue the development and upgrades in the C2BMC Testbed (CTB) to support flight &amp; ground tests. Continue Cyber Testing in the CTB to support continuous C2BMC spiral development. Continue C2BMC and NATO planning demonstrations and support to NATO live fire events. Provide Situational Awareness (SA) Node sustainment for the BMDS increment development to support ongoing planning and cooperation in the development and enhancement of interoperability between U.S. BMD systems and the NATO BMD systems. Provide infrastructure, network, and troubleshooting support to C2BMC Command Center (CCC), to include the BMDS Network Operations and Security Center (BNOSC), System Test and Operations Center (STOC), C2BMC System Support Center (CSSC), BMDS Communications Network (BCN), and the Distributed Training system (DTS). Specific and/or unique accomplishments for each FY are as follows:</li> </ul> <p><b>FY 2018 Plans:</b></p> <p>The net increase from FY 2017 to FY 2018 is a combination of the FY 2017 Congressional Add for FTG-11 test acceleration, increases for tests in accordance with IMTP v19.1 schedule (details at a higher classification level) coupled with the transfer out</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency		<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2017</b>	<b>FY 2018</b>
<p>of Cross Domain Solution funds to Budget Project MC01- Cyber Operations. Additionally, FY 2018 Missile Defeat and Defense Enhancements (MDDE) Budget Amendment increase for SM-3 Block IIA test support.</p> <p>Test Execution:</p> <ul style="list-style-type: none"> <li>- Integrate and test the BMDS OPIR Architecture to enable earlier cueing of sensor and shooter, improve threat tracking, and provide source information for discrimination processing.</li> <li>- Participate in GM, Intercept Flight Test to support the remaining Increment 4, BMDS Enhanced Homeland Defense Increment, and the fielding of Enhanced Homeland Defense (Spiral 8.2-1) in NORTHCOM/PACOM by testing the following capabilities: Engagement support tasking; BMD planning, SBIRS Increment 2 interface change and communications enhancements; AN/TPY-2 Forward-Based Mode (FBM) Space Situational Awareness (SSA); Unified Client for net-centric operations; new C2BMC infrastructure and architecture update.</li> <li>- Continue the execution of BMDS Ground Test, participate in OTA, Intercept Flight Test, and Cycle 2/Cycle 5 testing of C2BMC EPAA Phase 3/EOR (Spiral 8.2-3) suite to support Increment 5, European Phased Adapted Approach (EPAA) Phase 3 Situational Awareness (SA) Node sustainment and Robust IRBM Defense, fielding of C2BMC EPAA Phase 3/EOR (Spiral 8.2-3) in NORTHCOM/PACOM and EUCOM/CENTCOM.</li> <li>- Participate in a baseline of 4 flight test events to characterize performance and obtain experimental results that will be used to mature algorithms that fuse space, airborne, and terrestrial-based sensor data into 3D tracks in the boost and early mid-course phases of threat missile flyout.</li> <li>- Support EPAA Phase 3 Technical Capability Declaration.</li> </ul> <p><b>FY 2019 Plans:</b></p> <p>Test Execution:</p> <ul style="list-style-type: none"> <li>- Integrate and test the BMDS OPIR Architecture to enable wideband processing; integrate PACOM JEON threat capability. Additional OPIR coverage with the new Highly Elliptical Orbits (HEOs) and Geosynchronous Earth Orbits (GEOs) will be able to increase raid size and improve threat typing.</li> <li>- Participate in flight and ground test events to support the Increment 6 (Spiral 8.2-5) and Homeland Defense including LRDR, mid-term discrimination and Redesigned Kill Vehicle (RKV) integration by testing the following capabilities: C2BMC generation of BMD System Track (discrimination results by C2BMC selection); GMD RKV into the BMDS; SBX Forward-Based Discrimination; Aegis BMD boost phase cues of SBX; Long Range Discrimination Radar (LRDR) Integration into BMDS; Active Sensor Bias Monitoring &amp; Reporting; Existing Sensor Data Interfaces &amp; LRDR Data for Risk Reduction; and Cyber Security Enhancements.</li> <li>- Complete LRDR for Homeland Defense (Spiral 8.2-5) upgrades at the Missile Defense Integration and Operation Center (MDIOC), CO. providing support for test and training.</li> </ul>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
- Complete analysis associated with NATO Ensemble Test 7 and deliver results to NATO participants per NATO Communications and Information Agency agreement.			
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> The decrease from FY 2018 to FY 2019 is mainly attributed to the FY 2018 Missile Defeat and Defense Enhancement Budget Amendment increase for SM-3 Block IIA test support.			
<b>Accomplishments/Planned Programs Subtotals</b>	56.125	57.302	54.100

**C. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	37.809	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603895C: <i>Ballistic Missile Defense System Space Programs</i>	20.910	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency										<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 0400 / 4			<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>					<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>			
<b>C. Other Program Funding Summary (\$ in Millions)</b>											
			<u>FY 2019</u>	<u>FY 2019</u>	<u>FY 2019</u>					<u>Cost To</u>	
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>Base</u>	<u>OCO</u>	<u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Complete</u>	<u>Total Cost</u>
• 0604181C: <i>Hypersonic Defense</i>	0.000	75.300	120.444	-	120.444	157.672	142.296	117.381	119.434	0.000	732.527
• 0604673C: <i>Pacific Discriminating Radar</i>	0.000	0.000	95.765	-	95.765	164.167	497.630	604.085	402.890	0.000	1,764.537
<b>Remarks</b>											
<b>D. Acquisition Strategy</b>											
<p>The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Enhanced Homeland Defense (Spiral 8.2-1) will be fielded in FY 2018, fielding of EPAA Phase 3/EOR (Spiral 8.2-3) in FY 2019, and completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber ops support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.</p>											
<b>E. Performance Metrics</b>											
N/A											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication				Project (Number/Name) MT01 / C2BMC Test					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A
Remarks N/A															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A
Remarks N/A															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Master Test Plan - BMDS Level Testing GOV	MIPR	Army/Air Force : Various	0.000	2.517	Oct 2016	2.002	Oct 2017	2.505	Oct 2018	-		2.505	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure	SS/CPAF	Northrop-Grumman Corporation : Colorado Springs, CO	12.703	25.673	Oct 2016	25.004	Oct 2017	27.133	Oct 2018	-		27.133	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure Support	MIPR	Various : VA; OH; AL; NM; CA	8.246	3.534	Oct 2016	2.517	Oct 2017	1.274	Oct 2018	-		1.274	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS Level Testing	SS/IDIQ	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO	73.122	23.614	Jul 2017	27.779	Jul 2018	23.188	Jul 2019	-		23.188	Continuing	Continuing	Continuing

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Missile Defense Agency												<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 0400 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>						<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>			

  

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Integrated Master Test Plan - Integrated Master Test Plan BMDS level Testing (Element/System Test Lab Facilities)	SS/CPAF	Northrop-Grumman Corporation : Colorado Springs, CO	89.914	0.787	Oct 2016	0.000		0.000		-		0.000	0.000	90.701	0.000
<b>Subtotal</b>			183.985	56.125		57.302		54.100		-		54.100	Continuing	Continuing	N/A

  

<b>Remarks</b> N/A															
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<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

  

<b>Remarks</b> N/A															
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			<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			183.985	56.125		57.302		54.100		-		54.100	Continuing	Continuing	N/A

  

<b>Remarks</b> N/A															
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PE 0603896C: *Ballistic Missile Defense Command and Co...* **UNCLASSIFIED**  
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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Missile Defense Agency			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023
Enterprise Sensor Lab Infrastructure Support	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication				Project (Number/Name) MX01 / Command & Control, Battle Management, Communications (C2BMC) Development Support			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MX01: Command & Control, Battle Management, Communications (C2BMC) Development Support	397.104	111.323	103.440	112.910	-	112.910	119.861	120.577	123.051	126.959	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

N/A

**A. Mission Description and Budget Item Justification**

C2BMC Development Support provides operations engineering, integrated logistics, warfighter integration, deployment, and disposal of the current operational system and/or systems fielded in STRATCOM, NORTHCOM, PACOM, EUCOM, and CENTCOM and the operation of the C2BMC Control Center. This activity provides continuous support of the development, deployment, sustainment of the C2BMC training systems, and updates training material to stay current with fielded capabilities.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Operations Engineering	86.542	82.779	95.220
<b>Articles:</b>	-	-	-
<b>Description:</b> This activity funds C2BMC support of current operational, test, and training systems. Recurring efforts include: <ul style="list-style-type: none"> <li>- On-site maintenance, help-desk support, and developer reach-back support to ensure operational availability</li> <li>- C2BMC Command Center (CCC) 24 hours a day, 365 days a year operations providing system and network monitoring, system administration, and network defense against cyber-attacks</li> <li>- Integrated logistics support by providing a secure supply chain; reliability, availability, and maintainability (RAM) engineering; obsolescence engineering; and sparing to ensure operational availability</li> <li>- Cybersecurity engineering providing C2BMC Commercial-off-the-shelf (COTS) software/hardware updates and CCC upgrades that address system vulnerabilities, field quarterly updates to reduce system component vulnerability to cyber-attacks</li> <li>- Information System Security Officers (ISSOs) ensuring C2BMC compliance with latest cybersecurity requirements and policies</li> <li>- System modifications driven by Warfighter Improvement Process (WIP), Continuous Improvement Process (CIP), RAM and obsolescence engineering, and external systems such as SBIRS, GMD Fire Control (GFC), Aegis, Terminal High Altitude Area Defense (THAAD), Navy Link Monitoring and Management Tool (LMMT), AN/TPY-2, Standard Army Com (STACOM), DISA fiber networks, and Allied/Coalition interfaces</li> </ul>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency		<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MX01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC) Development Support</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2017</b>	<b>FY 2018</b>
<ul style="list-style-type: none"> <li>- CCMD integration providing C2BMC training, on-site Subject Matter Experts (SMEs), and surge SME support for real-world events, flight tests, ground tests, exercises, cyber assessments, and wargames</li> <li>- Facility modifications required to house current or future C2BMC equipment and transportation for moving C2BMC equipment</li> <li>- Integrated product support for tactical satellite communications (SATCOM) used in flight tests, hardened SATCOM, and associated shelters</li> <li>- Provide transportation for flight test equipment and SME support and analysis for numerous test, exercise, and real world events</li> <li>- Provide recurring proficiency training to CCMDs and keep training material and systems consistent with operational capabilities</li> </ul> <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p><b>FY 2018 Plans:</b> The net decrease in funding from FY 2017 to FY 2018 reflects the transition of the Transportable Radar Communications Complex (TRCC) and Modernization of Enterprise Terminal Transportable (MET-T) in PACOM, where the Army is assuming support responsibilities for program support of these communications capabilities partially offset by an increase attributed for risk mitigation to Operation Engineering requests supporting emerging Warfighter improvements.</p> <ul style="list-style-type: none"> <li>- Maintain high Operational Availability.</li> <li>- Maintain MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in EUCOM/CENTCOM and Enhanced Homeland Defense (Spiral 8.2-1) in NORTHCOM/PACOM.</li> <li>- Provide recurring proficiency training to CCMDs and kept training material and systems consistent with operational capabilities.</li> <li>- Decommission MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in STRATCOM, NORTHCOM, and PACOM.</li> </ul> <p><b>FY 2019 Plans:</b></p> <ul style="list-style-type: none"> <li>- Complete decommission of MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in STRATCOM, NORTHCOM, and PACOM.</li> <li>- Maintain MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in EUCOM/CENTCOM and Enhanced Homeland Defense (Spiral 8.2-1) in NORTHCOM/PACOM.</li> <li>- Initiate decommissioning activities for MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in EUCOM/CENTCOM.</li> <li>- Initiate sustainment of EPAA Phase 3/EOR (Spiral 8.2-3) deployed to EUCOM, CENTCOM, NORTHCOM, and PACOM.</li> </ul> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Net increase in funding from FY 2018 to FY 2019 reflects sustainment and operational costs supporting the planned deployment of EPAA Phase 3/EOR (Spiral 8.2-3) to EUCOM, CENTCOM, NORTHCOM, and PACOM coupled with planned reduction of sustainment costs due to decommissioning of MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in STRATCOM, NORTHCOM and PACOM and the initial decommissioning activities for MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in EUCOM/ CENTCOM.</p>			
<b>Title:</b> Concurrent Test, Training, and Operations (CTTO)		24.781	20.661
			17.690

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MX01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC) Development Support</i>	

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p align="right"><b>Articles:</b></p> <p><b>Description:</b> This element provides the development and sustainment of the C2BMC Training Support System (TSS), MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) / Enhanced Homeland Defense (Spiral 8.2-1) / EPAA Phase 3/EOR (Spiral 8.2-3) Distributed Training System (DTS) (formerly known as the Distributed Multi-Echelon Training System (DMETS) for PACOM, NORTHCOM, EUCOM, and CENTCOM. C2BMC connects all BMDS Elements through virtual and physical networks to facilitate integrated test, training, and operations within two coexistent realms - Operations and Certification. This enables the warfighter to become proficient on current and future software versions at the operational console; increases the developer's capacity to perform a variety of tests and upgrades on the operational BMDS; and decreases recall-to-mission operations times from weeks and days to hours and minutes. Recurring accomplishments include sustaining current training systems for BMDS training events for the Unified Combatant Command developing the next generation training systems, to include the integration of Red Force / Blue Force capability, to keep current with the operational system capabilities. Specific and/or unique accomplishments for each FY are as follows:</p> <p><b>FY 2018 Plans:</b> The decrease in funding from FY 2017 to FY 2018 reflects the planned decommissioning of the legacy DMETS upon completion of Enhanced Homeland Defense (Spiral 8.2-1) DTS deployment resulting in reduced development/upgrade efforts. - Deploy and sustain C2BMC EPAA Phase 3/EOR (Spiral 8.2-3) TSS and DTS.</p> <p><b>FY 2019 Plans:</b> - Initiate development on BMDS Increment 6c LRDR for Homeland Defense (Spiral 8.2-5) TSS and DTS.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in funding from FY 2018 to FY 2019 reflects planned reduction of TSS/DTS training devices due to completed decommissioning of MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in STRATCOM, NORTHCOM and PACOM.</p>	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	111.323	103.440	112.910

**C. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603881C: <i>Ballistic Missile</i>	197.171	292.262	214.173	-	214.173	199.399	197.451	174.161	152.174	Continuing	Continuing
<i>Defense Terminal Defense Segment</i>											

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MX01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC) Development Support</i>
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	37.809	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603895C: <i>Ballistic Missile Defense System Space Programs</i>	20.910	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing
• 0604181C: <i>Hypersonic Defense</i>	0.000	75.300	120.444	-	120.444	157.672	142.296	117.381	119.434	0.000	732.527
• 0604673C: <i>Pacific Discriminating Radar</i>	0.000	0.000	95.765	-	95.765	164.167	497.630	604.085	402.890	0.000	1,764.537

**Remarks**

**D. Acquisition Strategy**

The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Enhanced

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MX01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC) Development Support</i>
<p>Homeland Defense (Spiral 8.2-1) will be fielded in FY 2018, fielding of EPAA Phase 3/EOR (Spiral 8.2-3) in FY 2019, and completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber ops support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.</p> <p><b><u>E. Performance Metrics</u></b> N/A</p>		

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Missile Defense Agency</b>												<b>Date: February 2018</b>			
<b>Appropriation/Budget Activity</b> 0400 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>						<b>Project (Number/Name)</b> MX01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC) Development Support</i>			
<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Operations Engineering - Indirect Support	MIPR	DISA DECC/DISA TECC : Various	36.173	6.890	Oct 2016	4.177	Oct 2017	5.229	Oct 2018	-		5.229	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Unit Personnel, Control System Improvement Sustaining Support	MIPR	Army, Navy, Air Force : Various	0.000	0.912	Oct 2016	7.081	Oct 2017	5.274	Oct 2018	-		5.274	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering Training Support	SS/CPAF	Northrup Grumman : Boeing Huntsville, AL	0.000	1.747	Nov 2016	1.869	Nov 2017	1.959	Nov 2018	-		1.959	Continuing	Continuing	Continuing
Operations Engineering - Teleport Sustainment	MIPR	Various : Various	7.505	0.000		0.000		0.000		-		0.000	0.000	7.505	7.505
Operations Engineering - Unit Personnel, Control System Improvement Sustaining Support	SS/CPFF	Lockheed Martin Team : Huntsville, AL	272.226	76.993	Dec 2016	69.652	Dec 2017	82.758	Dec 2018	-		82.758	Continuing	Continuing	Continuing
Concurrent Test, Training, and Operations (CTTO) - CTTO/Training Enhancements	MIPR	Aviation and Missile Research Development and Engineering Center : Various	0.000	8.238	Dec 2016	7.081	Dec 2017	4.530	Dec 2018	-		4.530	Continuing	Continuing	Continuing
Concurrent Test, Training, and Operations (CTTO) - Concurrent Test, Training And Operations	SS/CPAF	Northrop Grumman : Boeing	4.610	0.000		0.000		0.000		-		0.000	0.000	4.610	4.610
Concurrent Test, Training, and Operations (CTTO) - Concurrent Test, Training, and Operations	SS/FPAF	COLSA ARC : Huntsville, AL	3.833	0.000		0.000		0.000		-		0.000	0.000	3.833	3.833
Concurrent Test, Training, and Operations (CTTO) - Training Enhancements	SS/CPIF	Lockheed Martin Team : Huntsville, AL, Colorado Springs, CO	72.757	16.543	Dec 2016	13.580	Dec 2017	13.160	Dec 2018	-		13.160	Continuing	Continuing	Continuing

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Missile Defense Agency													<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 0400 / 4					<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>					<b>Project (Number/Name)</b> MX01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC) Development Support</i>					

  

Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			397.104	111.323		103.440		112.910		-		112.910	Continuing	Continuing	N/A

**Remarks**  
N/A

  

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

**Remarks**  
N/A

  

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

**Remarks**  
N/A

  

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

**Remarks**  
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency											Date: February 2018				
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication					Project (Number/Name) MX01 / Command & Control, Battle Management, Communications (C2BMC) Development Support					
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			397.104	111.323		103.440		112.910		-		112.910	Continuing	Continuing	N/A
Remarks N/A															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency														Date: February 2018															
Appropriation/Budget Activity 0400 / 4										R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication										Project (Number/Name) MX01 / Command & Control, Battle Management, Communications (C2BMC) Development Support									
Significant Event Complete ▲				Milestone Decision Complete ★				Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆													
Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇													
										FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support										◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency			Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication	Project (Number/Name) MX01 / Command & Control, Battle Management, Communications (C2BMC) Development Support	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>				Project (Number/Name) MD40 / <i>Program-Wide Support</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	88.059	18.135	18.782	21.118	-	21.118	22.195	22.071	22.868	23.117	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Program Wide Support reflects proportional changes as a result of budget changes to the Ballistic Missile Defense Command and Control, Battle Management & Communication program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

**A. Mission Description and Budget Item Justification**

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA-wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Program Wide Support	18.135	18.782	21.118
<b>Articles:</b>	-	-	-
<b>Description:</b> N/A			
<b>FY 2018 Plans:</b> N/A			
<b>FY 2019 Plans:</b> N/A			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> N/A			
<b>Accomplishments/Planned Programs Subtotals</b>	18.135	18.782	21.118

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MD40 / <i>Program-Wide Support</i>
<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A		
<b>Remarks</b>		
<b>D. Acquisition Strategy</b> N/A		
<b>E. Performance Metrics</b> N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication				Project (Number/Name) MD40 / Program-Wide Support					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	3.579	0.086		0.376	Jul 2018	0.323	Jul 2019	-		0.323	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi: AK/AL/CA/CO/HI/MD/VA/NJ/NY/OCONUS	3.111	0.000		0.000		0.000		-		0.000	0.015	3.126	0.000
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AK, AL, CA, CO, HI, VA	2.947	1.019	Nov 2016	0.000		3.786	Jan 2019	-		3.786	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: AK, AL, CA, CO, HI, VA	22.388	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi: AK, AL, CA, CO, VA	47.045	0.819	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services Civilian Salaries, Travel, Training	Allot	Various : Multi: AL, CA, CO, VA	8.989	15.150	Nov 2016	18.406	Nov 2017	17.009		-		17.009	2.800	62.354	0.000
Program Wide Support - Agency Operations, Sustainment and GPC	Allot	Various : Multi: AL, CO, VA etc.	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities Maintenance SRM	MIPR	Various : Multi: AK, CA, CO, AL, MD, NJ, VA	0.000	1.061	Jan 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			88.059	18.135		18.782		21.118		-		21.118	Continuing	Continuing	N/A
Remarks N/A															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency										Date: February 2018					
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication					Project (Number/Name) MD40 / Program-Wide Support					
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			88.059	18.135		18.782		21.118		-		21.118	Continuing	Continuing	N/A
Remarks N/A															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency														Date: February 2018															
Appropriation/Budget Activity 0400 / 4										R-1 Program Element (Number/Name) PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication										Project (Number/Name) MD40 / Program-Wide Support									
Significant Event Complete ▲					Milestone Decision Complete ★					Element Test Complete ◆					System Level Test Complete ●					Complete Activity ◆									
Significant Event Planned △					Milestone Decision Planned ☆					Element Test Planned ◇					System Level Test Planned ○					Planned Activity ◇									
										FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
MD40 Program-Wide Support										◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇					

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Missile Defense Agency			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MD40 / <i>Program-Wide Support</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023